Cisco Catalyst 3500 Series XL

The Cisco Systems Catalyst® 3500 series XL is the industry's premier line of stackable 10/100 and Gigabit Ethernet switches that deliver premium performance, manageability, and flexibility, with unparalleled investment protection. The Catalyst 3500 series XL product family offers customers tremendous benefits through Gigabit Ethernet-based configuration options, new Cisco Switch Clustering multidevice management architecture, and embedded voice and IP telephony support.

The Catalyst 3500 series XL product family is ideally suited for enterprise wiring closets, branch offices, and medium-sized local-area networks (LANs), delivering best-in-class performance through its 10.8-Gbps switch fabric and deployment flexibility with a wide array of wiring closet connectivity options (http://www.cisco.com/warp/customer/cc/cisco/mkt/switch/cat/3500xl/prodlit/mierp_in.pdf). Customers can deploy a variety of switch stacking configurations using the Cisco GigaStack™ Gigabit Interface Converter (GBIC) (http://www.cisco.com/warp/customer/cc/cisco/mkt/switch/cat/3500xl/prodlit/gbic_ds.htm).

Cisco IOS® software and new Switch Clustering (http://www.cisco.com/warp/customer/cc/cisco/mkt/switch/cat/3500xl/prodlit/swclu_ov.htm) management architecture deliver valuable network administration cost savings. Switch Clustering allows users to manage more than 750 ports and up to 16 devices from a comprehensive, Web-based management interface. Because Switch Clustering is embedded and implemented logically through software protocols, it can be deployed across any supported Ethernet media and across all Cisco desktop switches—including the Catalyst 1900, 2900 XL, and 3500 XL switch families. Network administrators can now configure, manage, monitor, and upgrade an entire LAN cluster of switches as if they are a single entity, saving time, and maximizing productivity as the network grows or changes.

The Cisco Systems Catalyst 3500 series XL is a scalable line of stackable 10/100 and Gigabit Ethernet switches that delivers premium performance, manageability, and flexibility with unparalleled investment protection.

The Catalyst 3500 series XL family includes four switch models and the Cisco GigaStack GBIC:

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- *Catalyst 3548 XL*—A single-rack-unit (RU), stackable 10/100 and Gigabit Ethernet switch with 48 10BaseT/100BaseTX ports and two GBIC-based Gigabit Ethernet ports. The Catalyst 3548 XL is ideal for delivering dedicated 10- or 100-Mbps to individual users and servers in high-density workgroups from a stack, cluster, or standalone configuration. Built-in dual GBIC-based Gigabit Ethernet ports provide users with a flexible and scalable solution for Gigabit Ethernet uplinks and GigaStack GBIC stacking.
- *Catalyst 3524 XL*—A single-RU, stackable 10/100 and Gigabit Ethernet switch with 24 10/100 ports and two GBIC-based Gigabit Ethernet ports. The Catalyst 3524 XL is ideal for delivering dedicated 10- or 100-Mbps to individual users and servers in midsized workgroups from a stack, cluster, or standalone configuration. Built-in dual GBIC-based Gigabit Ethernet ports provide users with a flexible and scalable solution for Gigabit Ethernet uplinks and GigaStack GBIC stacking.
- *Catalyst 3512 XL*—A single-RU, stackable 10/100 and Gigabit Ethernet switch with 12 10/100 ports and two GBIC-based Gigabit Ethernet ports. The two gigabit ports accommodate a range of industry-standard GBICs, including the Cisco GigaStack GBIC, 1000BaseSX, 1000BaseLX/LH, and 1000BaseZX GBICs. The Catalyst 3512 XL is a high-performance, nonblocking switch, ideal for aggregating a small group of Catalyst 2900 series XL or Catalyst 1900 switches in a clustered configuration. In a standalone or stacked configuration, the Catalyst 3512 XL offers low-port density at a low entry price.
- *Catalyst 3508G XL*—A single-RU, stackable Gigabit Ethernet switch with eight GBIC-based Gigabit Ethernet ports. The Catalyst 3508G XL is ideal for aggregating a group of 10/100 and Gigabit Ethernet switches and Gigabit Ethernet servers through Cisco GigaStack GBICs or standard 1000BaseX GBICs.
- *GigaStack GBIC*—A versatile, low-cost, Gigabit Ethernet stacking GBIC that offers high-speed interconnectivity between Catalyst 3500 series XL and Gigabit Ethernet- enabled Catalyst 2900 series XL switches. The GigaStack GBIC is ideal for performance- and cost-conscious customers who require an independent stack bus to interconnect multiple Catalyst 3500 series XL and Gigabit Ethernet-enabled Catalyst 2900 XL switches.

The two-port Cisco GigaStack GBIC delivers high-speed interconnectivity between Catalyst 3500 series XL and modular Catalyst 2900 series XL switches.

Flexible Stacking with the GigaStack GBIC

The Catalyst 3500 series XL and Gigabit Ethernet-enabled Catalyst 2900 series XL switches can be stacked using the low-cost two-port Cisco GigaStack GBIC, which offers a range of highly flexible stacking and performance options. Customers can deploy a 1-Gbps independent stack backplane in a cascade configuration, or scale up to 5-Gbps of bandwidth in a star configuration using the Catalyst 3508G Gigabit Ethernet aggregation switch. Network managers may use one or both of the available GBIC ports to create high-speed uplinks to the network core, using standard Gigabit Ethernet or Gigabit EtherChannel® technology. High resiliency can also be implemented by deploying dual Gigabit Ethernet uplinks, a redundant GigaStack loopback cable, Cisco Uplink Fast technology for high-speed uplink failover, and PVST+ (Per VLAN Spanning Tree) for uplink load balancing. This flexibility makes the Catalyst 3500 series XL an ideal LAN edge complement to the Cisco Catalyst 6500 family of Gigabit Ethernet optimized core LAN switches. Figure 1 illustrates sample network designs with Catalyst 3500 series XL switches and Cisco GigaStack GBICs.

Customers can start with a low-cost GigaStack GBIC-based 1-Gbps independent stack backplane. At any point, users can increase stack performance to 5-Gbps using the same GigaStack GBICs in combination with the high-performance Catalyst 3508G Gigabit Ethernet aggregation switch.

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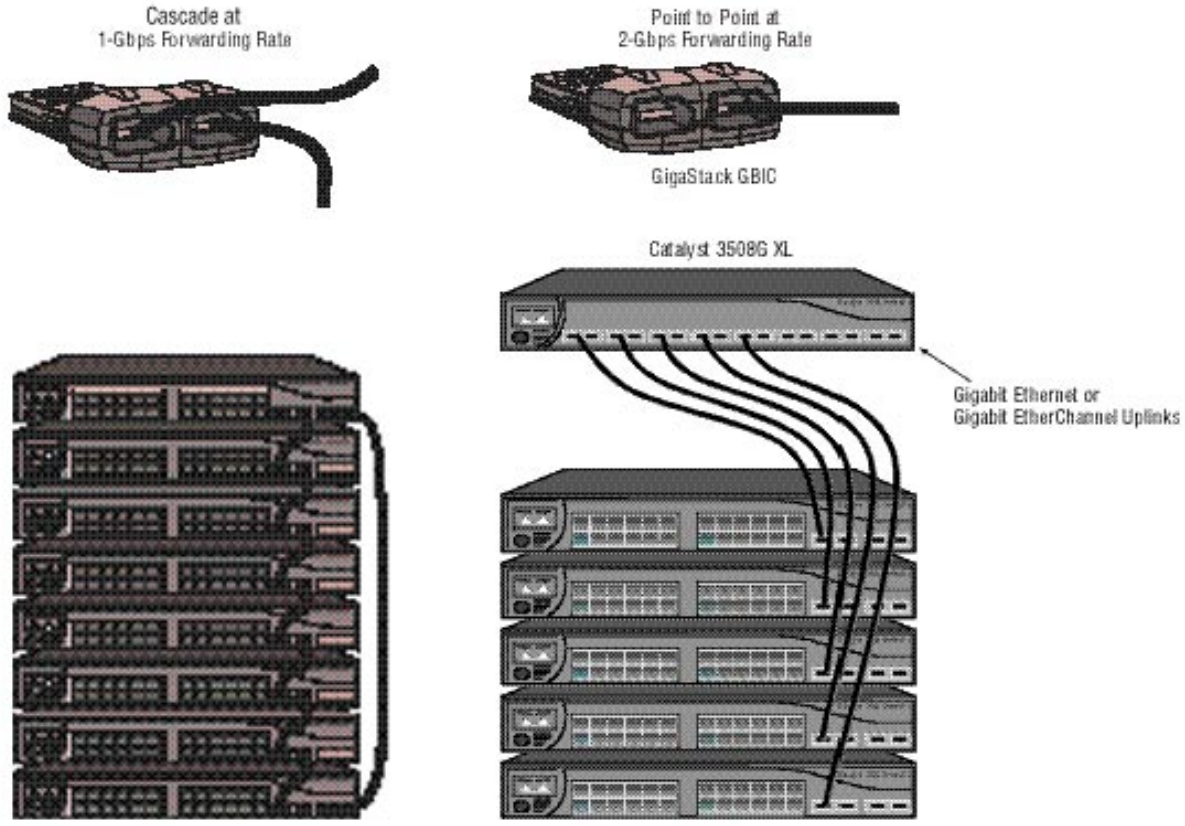
Figure 1 GigaStack GBIC Connection Options



Cisco Switch Clustering

Breakthrough Cisco Switch Clustering technology enables up to 16 interconnected Catalyst 3500 XL, 2900 XL, and Catalyst 1900 switches, regardless of geographic proximity, to form a single IP management domain. Switch Clustering supports a broad range of standards-based connectivity options and configurations to deliver levels of performance that are scalable to meet customer requirements. Switch Clustering connectivity options for the Catalyst 3500 series XL include Ethernet, Fast Ethernet, Fast EtherChannel ports, low-cost Cisco GigaStack GBIC, Gigabit Ethernet, and Gigabit EtherChannel ports. Because the technology is not limited by proprietary stacking modules and stacking cables, Cisco Switch Clustering expands the traditional stacking domain beyond a single wiring closet and lets users mix and match interconnections to meet specific management, performance, and cost requirements (Figure 2).

Cisco Switch Clustering can be accessed via a Web-based management interface, which allows network administrators to configure, monitor, and manage a switch from anywhere on the network through a standard browser such as Microsoft Internet Explorer or Netscape Navigator. Network administrators simply point their Web-browsers to the IP address of the cluster Command switch and access all management capabilities. The Web-based interface is launched from the switch itself and delivers simple, cluster-wide, device-level management, including port configuration, VLAN setup, network views, and port monitoring—all from a single graphical interface. Web-based management is an integral part of the Cisco Switch Clustering architecture, allowing users to easily configure and manage stacks and switch clusters, and administer software upgrades across multiple switches. Command switch and cluster management redundancy are ensured via an automatic failover scheme (Q1’00 software update) in the rare event of a command switch failure.

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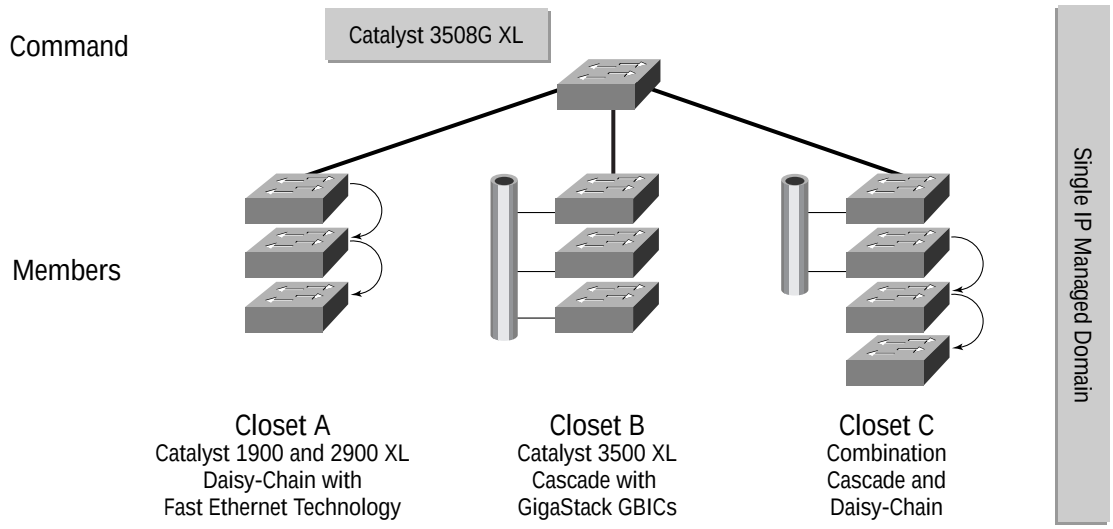
Figure 2 Example Switch Cluster Deployment Configuration



Quality of Service

All Catalyst 3500 series XL switches support LAN edge quality of service (QoS) based on 802.1p class of service (CoS) as well as port-based prioritization.

CoS is used for tagged packets while port-based prioritization is used for untagged packets. Priority scheduling is applied between the queues, which will assure that the high priority queue is always serviced before scheduling the low priority traffic. These features enable users to prioritize mission critical traffic, such as VoIP or ERP applications over regular traffic (such as FTP or generic Web traffic).

Management Features

Cisco Catalyst 3500 series XL switches include several exceptional features to increase network performance, manageability, and security. To boost performance, Fast EtherChannel and Gigabit EtherChannel technology offer from 400-Mbps to 4-Gbps high-performance bandwidth between Catalyst switches, routers, and servers. The Cisco Group Management Protocol (CGMP) enhances performance of multimedia applications and reduces network traffic by allowing a switch to selectively and dynamically forward IP multicast traffic to targeted end stations.

Users can also implement higher levels of data security and boost LAN performance by deploying up to 250 virtual LANs (VLANs) per switch. This ensures that data packets are forwarded only to stations within a specific VLAN, creating a virtual firewall between groups of ports on the network. VLAN trunks can be created from any port using either 802.1Q trunking or the Cisco Inter-Switch Link (ISL) VLAN architecture. VLANs using standards-based 802.1Q and ISL trunking provide broadcast control and enhanced security, and simplify adds, moves, and changes. Per VLAN Spanning Tree (PVST+) allows users to implement redundant uplinks while distributing traffic loads across multiple links—which is not possible with standard STP implementations. Cisco Uplink Fast technology ensures immediate transfer to the secondary uplink, enhancing overall network stability and reliability.

With the Catalyst 3500 series XL, network managers can implement high levels of port and console security. Media access control (MAC) address-based port level security prevents unauthorized stations from accessing the switch. Multilevel access security on the switch console prevents unauthorized users from accessing or altering switch configuration. Terminal Access Controller Access Control System (TACACS+) authentication enables centralized access control of the switch and restricts unauthorized users from altering the configuration.

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Applications

The three major product applications of the Catalyst 3500 series XL are defined as follows:

- *Enterprise Wiring Closet*—Catalyst 3500 series XL switches are deployed in the wiring closet at the enterprise edge, aggregated by Catalyst 4000/5X00/6X00 switches that implement multilayer services in the network core.
- *Midmarket/Branch Office LAN*—Catalyst 3500 series XL switches are deployed as the primary LAN backbone and desktop connectivity solutions in smaller site installations.
- *Low-Cost Multilayer Network*—When deployed together with a Layer 3 switch, the Catalyst 3500 series XL product line offers a high- performance multilayer solution for cost-conscious users.

Enterprise Wiring Closet

The Catalyst 3500 series XL creates a very cost-effective and scalable solution for enterprise wiring closet connectivity (Figure 3). Users can deploy high-performance 10/100 and Gigabit Ethernet solutions that will support bandwidth- intensive applications. Customers have the capability to implement GigaStack stacking and to link each switch to the network core over Gigabit Ethernet uplinks. Switched uplinks to a Cisco Catalyst network core use the 3500 XL's high-performance and high-availability features, including: dual redundant uplinks, Uplink Fast, PVST+, Gigabit EtherChannel technology, and other features. QoS and Cisco AVVID (Architecture for Voice, Video, and Integrated Data) are supported from the desktop to the network core. The Catalyst 3500 XL supports IEEE 802.1p to prioritize and queue traffic of connected desktops at the network edge.

Figure 3 Enterprise Wiring Closet with Catalyst 3500 Series XL

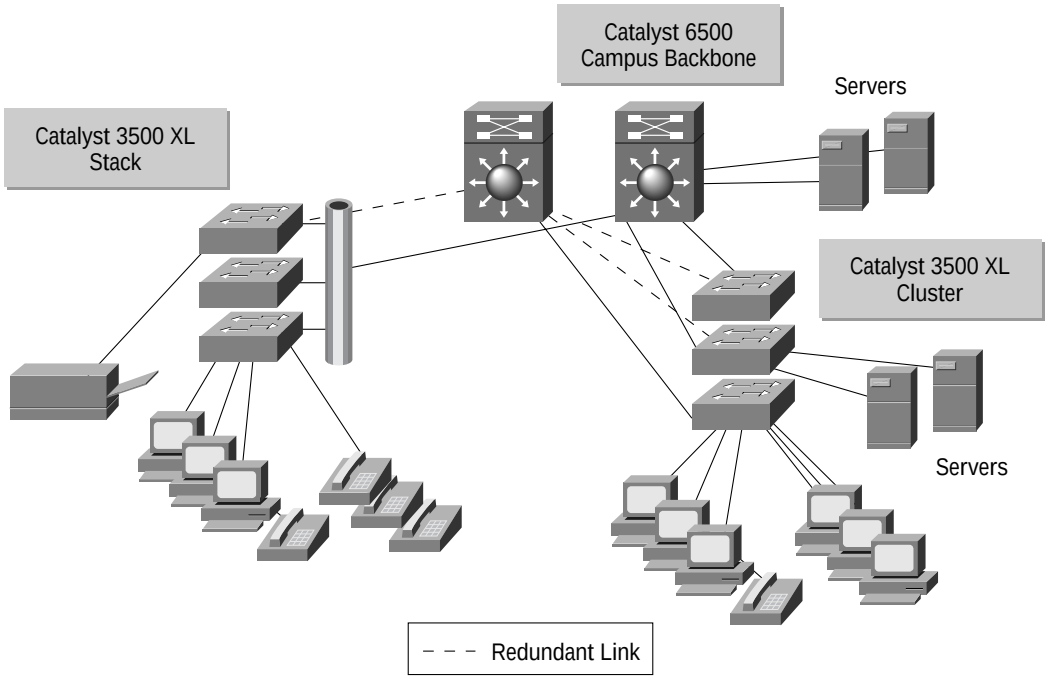

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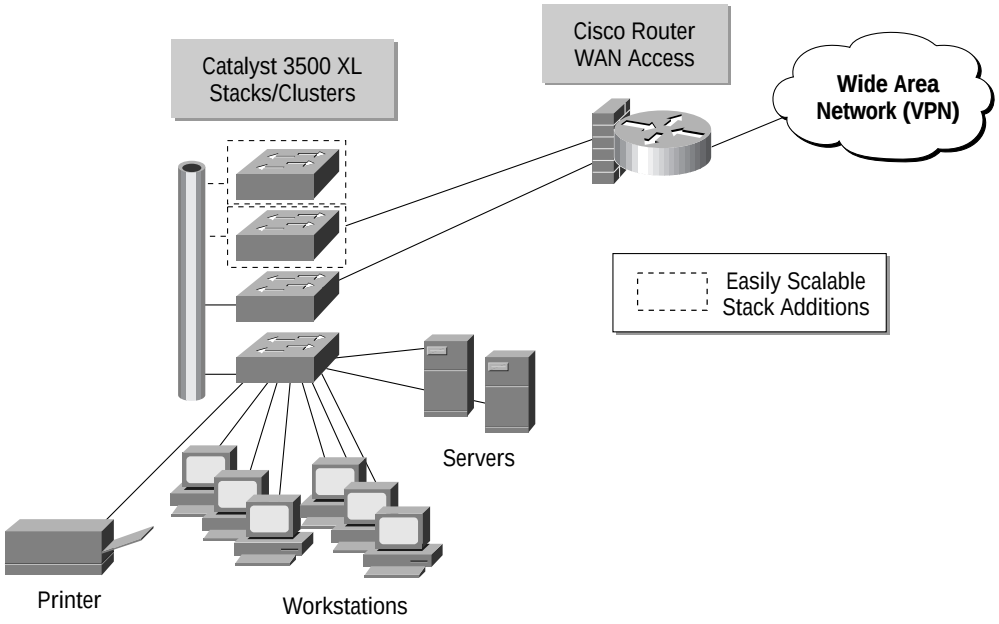
Figure 4 Branch Office LAN Design with Catalyst 3500 Series XL



Midmarket/Branch Office LAN

The Catalyst 3500 series XL can also be used as the primary LAN backbone in a smaller office environment for mid-market customers and enterprise branch offices (Figure 4). In these applications, the Catalyst 3500 series XL offers customers tremendous network scalability via Switch Clustering management and the ability to easily increase the LAN size with GigaStack stacking technology—making network additions and changes very easy.

Low-Cost Multilayer Services

When deployed together with a Catalyst Layer 3 switch, the Catalyst 3500 series XL product line offers an excellent low-cost multilayer switch solution for cost-conscious users (Figure 5). In small workgroup environments this combination stackable/scalable Layer 3 solution offers customers the ability to implement wire-speed connections with inter-VLAN routing, quality of service, and multilayer services.

Figure 5 Low-Cost Multilayer Design

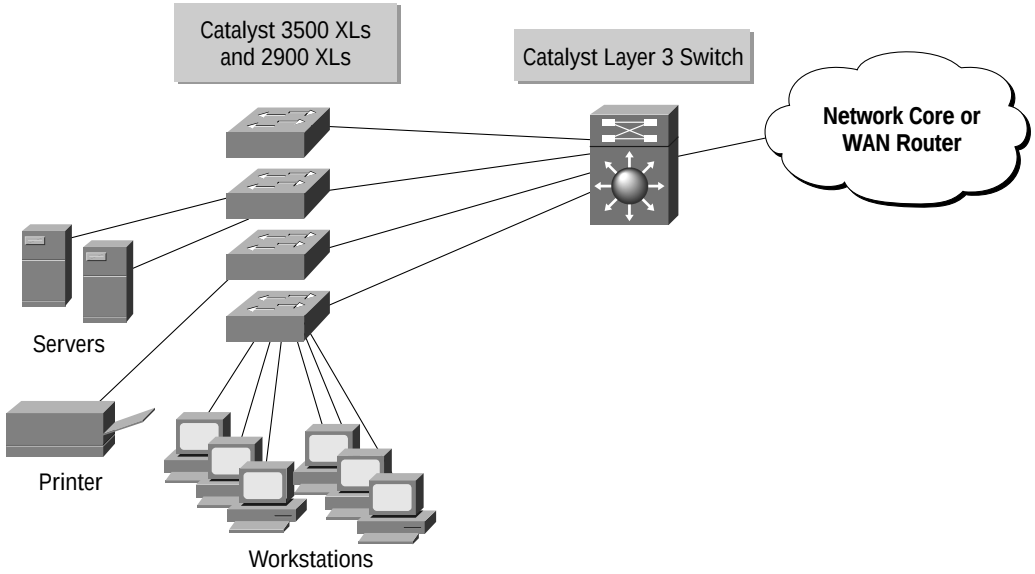


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Table 1 Features and Benefits Summary—Catalyst 3500 Series XL

Feature	Description	Benefit
10BaseT/100BaseTX Support	12, 24, or 48 autosensing 10BaseT/100BaseTX ports (Catalyst 3512XL, 3524 XL, and 3548 XL)	Delivers up to 200 Mbps of bandwidth per port for individual users, server farms, or workgroups to support bandwidth-intensive applications
Gigabit Ethernet Support	Two built-in, GBIC-based Gigabit Ethernet ports (Catalyst 3512 XL, 3524 XL, and 3548 XL)	Delivers up to 4-Gbps aggregated bandwidth to Gigabit Ethernet backbone, to Gigabit Ethernet-connected server farms, or between switches
GBIC-Based Gigabit Ethernet Aggregation	Eight fixed Gigabit Ethernet ports (Catalyst 3508G XL)	Delivers up to 5-Gbps aggregated forwarding bandwidth to connected switches in a point-to-point configuration
Class of Service Prioritization	IEEE 802.1p combined with two priority queues on 10/100	Provides quality-of-service and ability to prioritize mission critical and time sensitive traffic from data, voice, and telephony applications
Virtual LANs on All Ports	Up to 250 port-based VLANs per Catalyst 3500 series XL support	Improve performance and scalability by assigning users to VLANs associated with appropriate network resources, traffic patterns, and bandwidth
	Support for standards-based IEEE 802.1Q and Cisco ISL VLAN trunking protocols	Enables deployment of up to 250 enterprise-wide, end-to-end VLANs per 3500 series XL switch, spanning multiple routers, switches, and access routers Reduces administrative costs and simplifies network moves, adds, and changes Enables better management and control of broadcast and multicast traffic Improves network security by establishing separate VLAN groups for high-security users and relocating workgroup servers into secured centralized areas
Outstanding Performance	10.8-Gbps switching fabric and up to a 8.0-Mpps forwarding rate	Delivers premium performance to each 10BaseT/100BaseTX port
	4 MB shared-memory architecture	Ensures the highest-possible throughput by eliminating head-of-line blocking; minimizes packet loss and reduces congestion from multicast and broadcast traffic
	Full-duplex operation on switched 10/100 ports	Delivers up to 200-Mbps of bandwidth to end stations and servers, and between switches
	CGMP Fast Leave	Allows quick stoppage of multicasts to end stations that want to drop a data stream, reducing superfluous traffic on the network
	Cisco Group Management Protocol (CGMP)	Enables a switch to selectively and dynamically forward routed IP multicast traffic to targeted multimedia end stations, reducing overall network traffic
	Bandwidth aggregation through Fast EtherChannel technology or Gigabit EtherChannel	Delivers up to 8-Gbps of bandwidth between switches, routers, and individual servers
		Enhances fault tolerance
	Per-port broadcast storm control	Prevents faulty end stations from degrading overall systems performance with broadcast storms
Flexible Stacking and Scalable Switch Clustering Technology	Hardware-based independent stacking bus delivered through GigaStack GBIC supports multiple stacking options	Delivers up to 1-Gbps forwarding bandwidth to a cascade of up to nine Catalyst 3500 series XL and gigabit-enabled Catalyst 2900 series switches or 2-Gbps forwarding bandwidth in a point-to-point configuration
	High-performance aggregation using the Catalyst 3508G XL	Delivers up to 5-Gbps aggregated forwarding rate to a stack of switches in a point-to-point configuration
	Cisco Switch Clustering technology	Delivers flexibility, scalability, and ease of management with a broad range of connectivity options to up to 16 interconnected Catalyst 3500 XL, 2900 XL, and 1900 switches managed from a single IP address

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Table 1 Features and Benefits Summary—Catalyst 3500 Series XL (Continued)

Feature	Description	Benefit
Ease of Use and Ease of Deployment	Cluster wide software administration	Allows a network administrator to quickly and easily upgrade system software for up to 16 interconnected Catalyst 3500 XL, 2900 XL, and 1900 switches through a single CLI command or an easy-to-use CMS Web-based interface
	IEEE 802.3z-compliant 1000BaseSX, 1000BaseLX/LH, and 1000BaseZX physical interface support through a field-replaceable Gigabit Interface Converter (GBIC)	Provides standards-based technology and unprecedented flexibility in switch deployment
	Switch cluster web-based management interface	Easy-to-use, Web-based interface allows switch management from anywhere in the Intranet with a Web browser
	Autosensing on each 10/100 port	Detects attached device speed and automatically configures the port for 10- or 100-Mbps operation, easing switch deployment in mixed 10BaseT and 100BaseTX environments
	Autonegotiating on each 10/100 port	Automatically selects half- or full-duplex transmission mode to optimize bandwidth
	Default configuration stored in Flash memory	Ensures that a switch can be connected to a network and can pass traffic with minimal user intervention
	19-inch, rack-mountable Catalyst 3508G XL, 3512 XL, 3524 XL, and 3548 XL are each available in one rack-unit-high (1.73 in.) enclosure	Compliant with standard 19-inch, rack-mount scheme for easy installation; allows high-density port allocation while conserving valuable rack space in the wiring closet

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Table 1 Features and Benefits Summary—Catalyst 3500 Series XL (Continued)

Feature	Description	Benefit
Superior Manageability	Cisco Cluster Management Suite (CMS)	Built-in HTTP server enables Web-based management interface through a standard browser such as Netscape Navigator or Microsoft Explorer
		Provides cluster and network topology views of a group of Catalyst 3500 XL, 2900 XL, and Catalyst 1900 switches
	Simple Network Management Protocol (SNMP) and Telnet interface support	Delivers comprehensive in-band management
	Telnet support for up to five simultaneous sessions	Allows multiple management CLI-based sessions over the network
	Support for CiscoWorks2000 network management software	Provides a common management interface for Cisco routers, switches, and hubs
	Four groups of embedded Remote Monitoring (RMON) (History, Statistics, Alarm, and Events)	Provides enhanced manageability, network monitoring, and traffic analysis
	Support for all nine RMON groups through use of a switch-port and analyzer port	Permits traffic monitoring of a single port, a group of ports, or the entire switch from a single network analyzer or RMON probe
	8/16 MB DRAM and 4 MB Flash memory onboard	Enables delivery of a continuous stream of software upgrades and enhancements, maximizing customer return on investment
	Autoconfiguration	Eases deployment of switches in the network by automatically configuring multiple switches across a network via a boot server
	Domain Name Services (DNS)	Provides IP address resolution with user-defined device names
	Trivial File Transfer Protocol (TFTP)	Reduces the cost of administering software upgrades by downloading from a centralized location
	Network Time Protocol (NTP)	Provides an accurate and consistent timestamp to all switches within the intranet
	Address Resolution Protocol (ARP) discovers the MAC address that corresponds to the IP address for any given host on the network	Allows the network manager, from a central console, to identify a host IP address and its corresponding MAC address

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Table 1 Features and Benefits Summary—Catalyst 3500 Series XL (Continued)

Feature	Description	Benefit
Security and Redundancy	MAC-based port level security	Secures a port to an individual MAC address group of up to 132 MAC addresses; addresses can be learned or manually entered; can prevent unauthorized stations from accessing the switch
	Password-protected in-band and out-of-band management	Provides protection against unauthorized configuration changes and secures against unwanted intruders
		Provides administrators the choice of level of security, notification, and resulting actions
	User-selectable address learning mode	Simplifies configuration and enhances security
	Multilevel security on console access	Prevents unauthorized users from altering the switch configuration
	TACACS+ authentication	Enables centralized control of the switch and restricts unauthorized users from altering the configuration
	Redundant stacking connections	Support for a redundant loopback connection in top and bottom switches in a stack
	IEEE 802.1D Spanning-Tree Protocol	Supports redundant backbone connections and loop-free networks, simplifies network configuration, and improves fault tolerance
	Cisco Uplink Fast technology	Ensures quick failover recovery, enhancing overall network stability and reliability
	MTBF exceeds 150,000 hours	Designed to provide the highest reliability for maximum network uptime
	Cisco 600-watt redundant AC power system option	Provides a backup power source for up to four separate units for improved fault tolerance and network uptime
Warranty	Lifetime limited warranty	Backed by Cisco service and support and the technology leadership that extends the reach of networks worldwide

Table 2 Orderability and General Availability

Model	Description	Orderability	General Availability
Base Units			
WS-C3512 XL-A	Catalyst 3512 XL-A: 12-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Standard Edition)	Now	Now
WS-C3512 XL-EN	Catalyst 3512 XL-EN: 12-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Enterprise Edition)	Now	Now
WS-C3524 XL-A	Catalyst 3524 XL-A: 24-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Standard Edition)	Now	Now
WS-C3524 XL-EN	Catalyst 3524 XL-EN: 24-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Enterprise Edition)	Now	Now
WS-C3548 XL-A	Catalyst 3548 XL-A: 48-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Standard Edition)	December 13, 1999	January 2000
WS-C3548 XL-EN	Catalyst 3548 XL-EN: 48-port 10/100 switch with two fixed GBIC-based 1000BaseX uplinks (Enterprise Edition)	December 13, 1999	January 2000
WS-C3508G-XL-A	Catalyst 3508 XL-A: eight-port GBIC-based 1000BaseX Gigabit switch (Standard Edition)	Now	Now
WS-C3508G-XL-EN	Catalyst 3508 XL-EN: eight-port GBIC-based 1000BaseX Gigabit switch (Enterprise Edition)	Now	Now
GBICs			
WS-X3500-XL	GigaStack GBIC: Gigabit Ethernet Stacking GBIC for Catalyst 3500 XL and gigabit-enabled Catalyst 2900 XL switches	Now	Now

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Model	Description	Orderability	General Availability
WS-G5484=	SX GBIC: 1000BaseSX short wavelength GBIC (multimode fiber only)	Now	Now
WS-G5486=	LX/LH GBIC: 1000BaseLX/LH, long wavelength/long haul GBIC (single or multimode fiber)	Now	Now
WS-G5487=	ZX GBIC: 1000BaseZX, extended reach GBIC (single mode fiber)	Now	Now
CAB-GS-1M	1-meter cable for GigaStack GBIC	Now	Now

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